

# Single Frequency Lasers for Space-Based Wind and Aerosol Lidar, Phase II

Completed Technology Project (2009 - 2012)



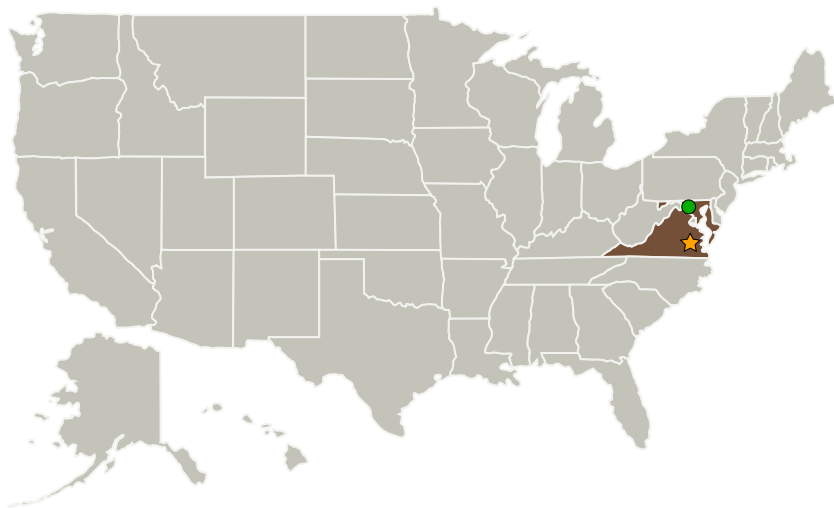
## Project Introduction

Stable, single-frequency cw lasers operating at 2  $\mu\text{m}$  and at 1064/532/355 nm are needed in a number of lidar systems that are being planned for NASA airborne and space-based lidar systems. These include the following.

## Anticipated Benefits

Stable, single-frequency cw lasers operating at 2  $\mu\text{m}$  and at 1064/532/355 nm are needed in a number of lidar systems that are being planned for NASA airborne and space-based lidar systems. These include the following. 1. Direct Detection Doppler Wind Lidar systems that operate at 355 nm. 2. Coherent Wind Lidar systems that operate at 2  $\mu\text{m}$ . 3. High Spectral Resolution Lidar systems that operate at 1064/532/355/nm. 4. Ozone DIAL systems. At least two missions that have been recommended by the NRC Earth Science Decadal Survey will need the technology that we propose to develop. These are the 3D-Winds mission and the ACE (Aerosol/Clouds/Ecosystems) mission. We have identified the following three possible non-NASA commercial applications. 1) Fourier Transform Spectroscopy for remote sensing applications. A stable and robust single frequency 1064 nm source is needed to support these activities. 2) Direct Detection Wind Lidar development at a number of aerospace companies. We have identified at least four companies that are interested in using the technology we are proposing to develop as a part of wind lidar systems that they are developing for balloon-based, airborne, and space-based applications. 3) Development of an aircraft based water vapor lidar for atmospheric studies of the troposphere. A 1064 nm seed laser will be needed for the water vapor lidar we have jointly proposed to build.

## Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
★ Langley Research Center(LaRC)	Lead Organization	NASA Center	Hampton, Virginia
● Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland
Metis Technology Solutions, Inc.	Supporting Organization	Industry Women-Owned Small Business (WOSB)	Albuquerque, New Mexico

## Primary U.S. Work Locations

Maryland	Virginia
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## Project Transitions

**March 2009:** Project Start

 **January 2012:** Closed out

## Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Lead Center / Facility:**

Langley Research Center (LaRC)

**Responsible Program:**

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

Carlos Torrez

**Project Manager:**

Gary C Jahns

**Principal Investigator:**

Floyd Hovis

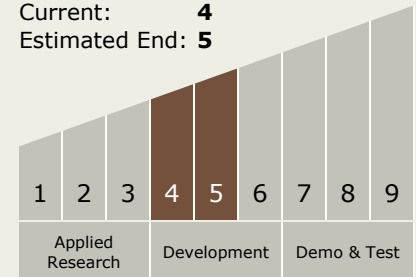
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## Technology Maturity (TRL)

Start: **4**  
Current: **4**  
Estimated End: **5**



## Technology Areas

### Primary:

- TX08 Sensors and Instruments
  - └ TX08.1 Remote Sensing Instruments/Sensors
    - └ TX08.1.5 Lasers